UNITED STATES DEPARTMENT OF AGRICULTURE
Forest Service

Ewing Mountain Vegetation Project

Environmental Assessment

Mount Rogers National Recreational Area, George Washington and Jefferson National Forests

Grayson, Wythe, and Carroll Counties, Virginia

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Introduction

The Ewing Mountain Vegetation Project is located on the Mount Rogers National Recreation Area (Mt. Rogers NRA) within Grayson, Wythe, and Carroll Counties, about 20 miles south of Wytheville, Virginia. The project area is approximately 17,200 acres in size and spreads across Slate Spring Branch-Cripple Creek, Poor Branch-New River, Brush Creek-New River, Francis Mill Creek-Cripple Creek, Eagle Bottom Creek-New River, and Turkey Fork-Elk Creek (HUC 12) sub-watersheds. The following map (Figure 1) identifies the project area location.

This project is designed based on the vegetation management objectives of the 2004 *Revised Land and Resource Management Plan Jefferson National Forest* (hereinafter referred to as the Forest Plan) (USDA Forest Service, 2004a) . It includes eleven management prescriptions (Rx), the largest of which, 7E2 *Dispersed Recreation Areas – Suitable*, accounts for about sixty percent of the project area. Areas in this prescription are managed to provide a variety of dispersed recreation opportunities in a manner that protects and restores the health, diversity, and productivity of the land. This includes the use of vegetation treatments and commercial timber harvest to achieve the desired conditions.

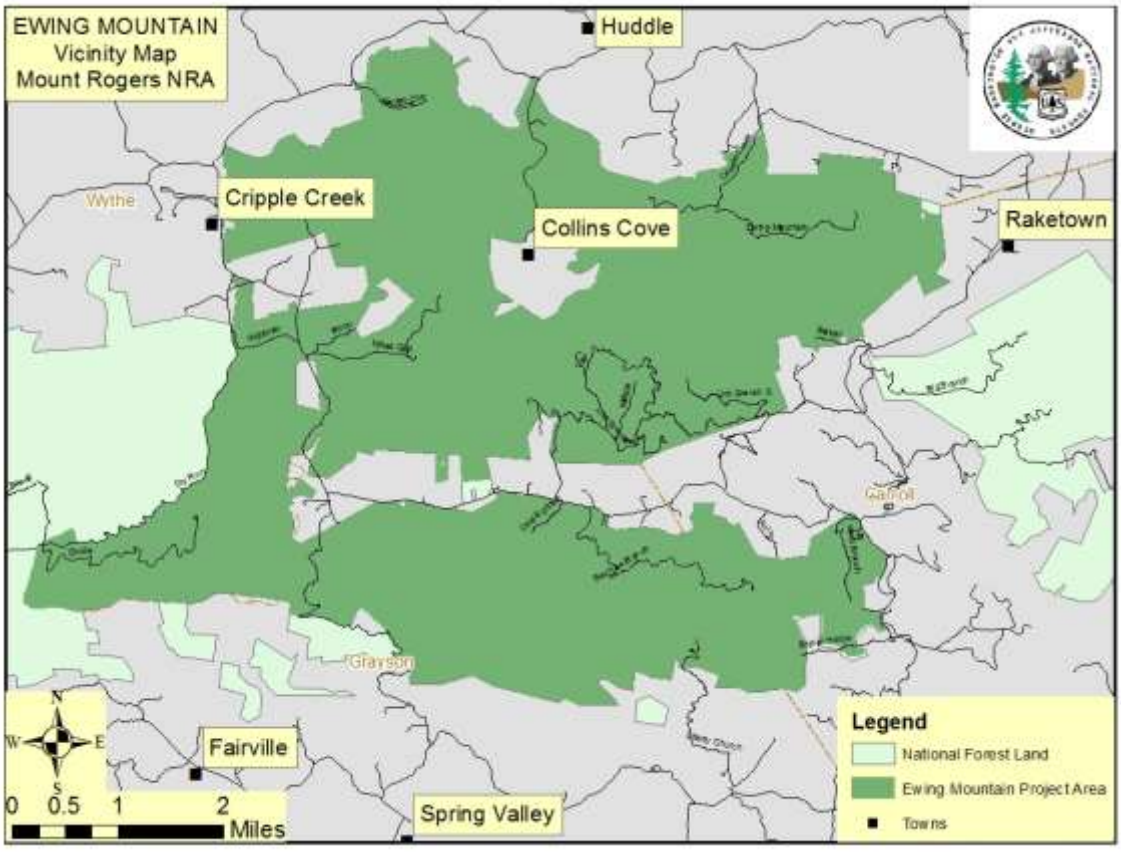

Figure 1. Ewing Mountain project location

Purpose and Need

The purpose and need of the Ewing Mountain project is focused on addressing the difference between the existing condition and the desired condition and the goals and objectives of the Forest Plan. Currently, almost three-fourths of the area is over eighty years of age. The overstory closed canopy condition dominates and suppresses understory vegetation growth. The intent is to create and enhance existing early successional, old-field, and grassland habitat, trend towards the desired composition of vegetation species, structure, and function, and provide wood products to help meet local demand. Actions should trend the area towards a needed mix of forest successional stages and community types.

Create and enhance habitat

Many mixed hardwood stands in the project area are gradually converting towards later successional shade tolerant species, such as maple and beech. There has also been a decrease in the structural diversity of theses stands; large tracts are in closed canopy conditions, limiting the range of suitable habitat.

A variety of tree species are encroaching on existing upland openings and early successional forested habitats are transitioning to the next successional stage within the project area. Areas that were once dominated by early successional, shade intolerant yellow pine such as shortleaf (*Pinus echinata)* and pitch pine (*Pinus rigida*) are being affected by insect attacks and encroachment of mountain laurel (*Kalmia latifolia*) and rhododendron (*Rhododendron maximum*). These changes are contributing to the gradual loss of vital habitat components for many wildlife species including chestnut-sided warbler (*Setophaga pensylvanica*), American woodcock (*Scolopax minor*), least weasel (*Mustela nivalis*), ruffed grouse (*Bonasa umbellus*), eastern wild turkey (*Meleagris gallopavo silvestris*), and black bear (*Ursus americanus*).

The desired condition is a mix of forest communities, varying by the land type association. Diverse composition and stocking within the project area would contribute to the establishment of shrubs and grasses needed by many game and non-game species. A mix of successional stages would be dispersed throughout the project area. In areas emphasizing ruffed grouse/woodcock habitat management, a minimum of ten percent early successional habitat is identified as a forest plan objective.

The Pellbridge area has a white pine dominated, closed-canopy stand where the conditions have suppressed herbaceous and shrub vegetation in the understory and there is insufficient hard or soft mast production. Conversion of this stand would improve habitat for early successional species and other watchable wildlife. The resulting old-field and grassland habitats will benefit species such as golden-winged warbler (*Vermivora chrysoptera*), loggerhead shrike (*Lanius ludovicianus*), orchard oriole *(Icterus spurius*), and white-tailed deer (*Odocoileus virginianus*).

To move the project area towards these desired conditions, there is a need to increase structural diversity while maintaining the resiliency of the mid and late seral successional habitat. This should include the creation and retention of snags for roosting and denning. There is also a need to maintain upland openings to prevent the encroachment of tree species, create and improve early successional forested habitat, and stimulate the growth of berry-producing shrubs and mast producing trees for wildlife habitat diversity.

Sustain forest and ecosystem health.

Within the project area, overstocked stands exhibiting reduced growth rates are susceptible to insect and disease infestations. The structural diversity across stands within the project area is limited. Competition for sun, water and nutrients is reducing the growth of the trees and greatly reducing the regeneration of early successional yellow pines and other important mast producing species. Non-native, invasive plants, such as autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), and tree-of-heaven (*Ailanthus altissima*), have been identified within the project area.

The Forest Plan describes a desired condition characterized by overall structural heterogeneity across multiple spatial scales. As the project area trends towards this desired condition, growth rates begin to rise and the regeneration of pines and important mast producing species occurs on appropriate sites. The presence and spread of non-native, invasive plants is limited.

There is a need to reduce stand density and open the canopy in the project area to sustain forest health, facilitate pine and oak regeneration, increase tree vigor and growth, improve wildlife habitat, enhance vegetative diversity, and minimize insect and disease attacks. There is also a need to reduce current infestations and future spread of non-native, invasive plants.

Offer wood products to contribute to the local market

Many of the habitat improvement and forest health objectives in this project can be accomplished through commercial harvest and thinning treatments that would help to meet the demand for wood products in the communities in and around the Mt. Rogers NRA

Goal 15 in the Forest Plan directs that “where forest management activities are needed and appropriate to achieve the desired composition, structure, function, productivity, and sustainability of forest ecosystems: a result of such activities will also be to provide a stable supply of wood products for local needs.” Furthermore, Forest-wide Objective 15.01 states, “Provide a total Timber sale Program of 4.0 million cubic feet (MMCF) annually” (Forest Plan, p. 2-32).

Public Involvement

The current Ewing Mountain project first appeared on the Mt. Rogers NRA's quarterly Schedule of Proposed Actions (SOPA) in the fourth quarter of fiscal year 2018 as the Ewing Mountain Management Project and has appeared on the schedule as such since that time.

Scoping was conducted by the District Interdisciplinary Team (ID Team) to gather information about the project area and to identify the issues and concerns related to the proposed action. Scoping letters were sent out May 16, 2019 to interested and affected agencies, organizations, and individuals informing them of the preliminary proposal and requesting their input. Twenty-four letters were received in response to this initial scoping. Comments were considered in the development of the proposed action.

In April of 2021, a draft Environmental Assessment was provided for public review and comment. An email and hardcopy letters were sent out and a legal notice was published in the Bristol Herald Courier on Wednesday, April 28th, 2021 to notify interested parties. This initiated the comment period, which ended on Friday, May 28th, 2021.

The Forest Service received correspondence from ten individuals, organizations, and agencies; responses to relevant comments have been compiled in the Ewing Mountain Response to Comments document (EwingResponseToComments.pdf) posted on the project website (https://www.fs.usda.gov/project/?project=44665).

Issues

Input gathered from all sources during the comment period was evaluated by the ID Team for relevance to the project. These sources included the general public, user groups, conservation groups, other government agencies, and internal Forest Service review. Some of the comments were determined to be not relevant (non-substantive) to the project because they were:

a) Beyond the scope of the proposal;
b) Unrelated to the decision being made;
c) Already decided by law, regulation or policy;
d) Conjectural in nature or not supported by scientific evidence; or,
e) General in nature (not specific to this project) or position statements not supported by reasons.

Relevant comments were considered in formulating and developing the proposed action in an iterative process called a "rolling alternative". This process adapted the proposed action to respond to concerns and issues identified in the comments and initial project analysis. This produced some alternatives to the proposed action that were considered but not analyzed in

detail. Some of the changes include rerouted access, additional stands for treatment, and the placement of an existing road into the Forest Service Road (FSR) system.

Comments also led to the identification of several issues that served as the focus of this analysis.

1. The Forest Service needs to manage the land in a way that will move the conditions towards those described in the Forest Plan.
2. The project area is very popular for recreational use, including horseback riding. The Forest Service should consider the effects of the proposed treatments on the scenery and the existing trails.
3. Soil erosion impacts to fish and aquatic wildlife from the proposed treatments and horseback use on non-system trails within the project area should be mitigated.
4. Steps should be taken to avoid the introduction and spread of invasive species on the NRA.
5. The project should avoid impact to karst in general and the Raven Cliff area in particular.
6. The Forest Service should consider climate change and the changes to carbon storage from the proposed treatments.

Decision to be Made

Based on the stated purpose and need, the Responsible Official, who for this project will be the Mt. Rogers NRA Ranger, will review the analysis in the environmental assessment for this project and decide the following:

- Whether the proposed action could result in a significant impact requiring an environmental impact statement to be prepared.
- Whether to implement the proposed action or an alternative, specific design criteria, mitigation measures, and/or project monitoring.

Proposed Action

The proposed Forest Service vegetative treatments would trend conditions towards the desired habitat mix for the Management Prescriptions as described in the Forest Plan. All proposed treatments occur within management prescriptions *7E2 - Dispersed Recreation Areas – Suitable*, *7G - Pastoral Landscapes*, *8E1 - Ruffed Grouse/Woodcock Habitat Emphasis*, *9H -Management, Maintenance, and Restoration of Forest Communities*, *7B - Scenic Corridors*, and *7D - Concentrated Recreation Zones*. The extent of activities has been estimated and is subject to variability due to measurement error and necessary site-specific updates.

Timber Harvest

This proposal includes timber harvest within 59 hardwood, pine, and mixed hardwood/pine stands, on approximately 1,782 acres. Regeneration cuts would be used to create early successional habitat (ESH) across approximately 394 acres, a white pine clearcut with type conversion treatment would create an additional 12 acres of ESH in the form of old-field and grassland habitat, and commercial thinning would open up the overstory canopy on approximately 1,375 acres to promote open canopy late successional conditions. Treatments are listed by compartment and stand in Appendix B.

Regeneration treatments would be followed by manual site preparation using chainsaws and supplemental planting as needed. A basal bark herbicide application of triclopyr (Garlon or generic equivalent) with an adjuvant or low volume foliar spray of glyphosate (Roundup or generic equivalent) may be used to control non-native species, invasive species, red maple (*Acer rubrum*), and other undesirable species throughout the regeneration treatments.

Type conversion of the white pine stand would also include a basal bark herbicide application of triclopyr with an adjuvant or low volume foliar spray of glyphosate may be used to control non-native and undesirable species. The emphasis would be on the establishment of low grasses and wildflowers with some native deciduous and evergreen shrubs appropriate to the 7G *Pastoral Landscapes* management prescription.

Thinning treatments may be followed by basal bark application of triclopyr with an adjuvant to control invasive woody species such as autumn olive, multiflora rose, tree-of-heaven, and royal paulownia (*Paulownia tomentosa*) in these stands. Basal bark application is not a broadcast treatment method; only individual non-native invasive species would be treated if found in the units.

A low volume foliar spray of glyphosate or triclopyr would also be used along roads to control invasive woody species. It is expected that this would total approximately 158 acres of treatment, based on a 30-foot wide buffer.

Timber harvest operations would include a number of connected actions. Approximately sixteen acres of log landings would be constructed as needed to provide adequate space for safe and efficient logging, loading, and hauling operations. Following completion of their use, these areas would be revegetated to prevent erosion and provide habitat and forage for wildlife. Approximately 5.1 miles of temporary road would be constructed to provide access to the treatment areas. These roads would be revegetated, bermed and closed to vehicle traffic after all proposed activities requiring access are completed. Approximately 0.5 miles of existing road in the Pellbridge area would be added to the FSR system, and Long Branch Road (FSR 794), approximately 1.1 miles, would be decommissioned.

Road maintenance would be performed on FSRs within the project area to facilitate project activity implementation. This would include brushing, ditch pulling, blading, culvert replacement, turn-widening, and gravel placement. The following FSRs would receive some or all of these maintenance activities.

Table 1. Project area road maintenance

Road Number	Road Name	Length (miles)
FSR 667	Tate	2.7
FSR 667A	Tate Spur A	0.3
FSR 690	Lick Branch	4.1
FSR 690D	Lick Branch D	0.6
FSR 797	Bournes Branch	2.1
FSR 992	Shepherds Corner	0.4
FSR 4050	Mikes Gap	1.8
FSR 4050A	Mikes Gap A	0.1
FSR 4051	Shiloh	0.5
FSR 4053	Wolfman	0.8
FSR 49710	Cripple Creek	1.9
FSR 49780	Ewing Mountain	1.9
FSR 49790	Barker	0.6
FSR 4054	Pellbridge	0.5

Wildlife Habitat Enhancement

Existing wildlife openings, consisting of small clearings and roads mowed as linear wildlife strips, occur sporadically throughout the project area. Management activities or natural processes maintain these areas in an open condition for the long-term. Temporary roads, skid roads, and landings used to support wood product removal provide temporary wildlife openings and would be seeded with a Forest Service approved seed mixture. Additional beneficial grasses, forbs, and shrubs may be planted as needed in existing and newly-created openings to contribute to wildlife and soil objectives. The project would also create or maintain two ruffed grouse drumming logs per acre on average across the project area and create up to four rainwater vernal pools.

Table 2. Proposed Action Summary Table

Treatment / Action	Extent[1]
Regeneration	
Clear-cut Harvest	22 acres
Clear-cut with reserves (less than 15 ft^2 residual BA)	300 acres
Coppice with reserves (15 – 25 ft^2 residual BA)	24 acres
Shelterwood with reserves (20 – 40 ft^2 residual BA)	48 acres
Total regeneration treatment [2]	***394 acres***
Open Canopy Habitat	
Thinning [3]	1,375 acres
Wildlife Habitat Enhancement	
Clear-cut with type conversion	12 acres
Long Term Wildlife Openings - Management of existing wildlife openings including feathering (planting shrubs along hard edges) the edges / cutback field borders, overseeding a wildlife friendly mix, and controlling undesirable species	30 acres
Short Term Wildlife Openings – Planting with wildlife approved seed mixture of skid roads, landings and temporary roads where feasible	About 78 acres
Rainwater Vernal Pools – Where appropriate create rainwater vernal pools to provide additional water sources for wildlife and breeding habitat for amphibians.	Up to 4 ponds
Drumming logs	2 per acre
Vegetative Treatments / Restoration Actions	
Manual site preparation	394 acres
Southern yellow pine planting (within stands proposed for regeneration)	up to 64 acres, as needed
Herbicide management of non-native invasive species within treatment stands	1,782 acres
Herbicide management of non-native invasive species along roads.	158 acres

[1] Extent has been estimated for all activities and is subject to variability due to measurement error and necessary site-specific updates.

[2] Does not include the 12 acres of *Clear-cut with type conversion* proposed for wildlife habitat enhancement

[3] The target BA would vary by stand based on current BA and stand type.

Treatment / Action	Extent[1]
Roads, Skid Roads, and Landings	
Temporary road	5.1 miles
Skid trails - estimated 15 foot width	148,816 feet; ~ 51 acres
Bladed skid roads - estimated 15 foot width	5,601 feet; ~ 2 acres
Log landings - estimated 0.25 acre each	61 landings; ~ 15.25 acres
System road maintenance	18.3 miles
System road decommissioning	1.1 miles

Design Criteria and Resource Protection Measures

The proposed action would follow the Forest-wide common standards stated in the Forest Plan. Project-specific resource protection measures (RPMs) were developed for this project in addition to standards outlined in the Forest Plan. The relevant Forest Plan standards and project specific RPMs are listed in Appendix A.

Monitoring

Monitoring of the project actions would occur to ensure that various aspects of the project adhere to the standards of the Forest Plan, the applicable Virginia's Forestry Best Management Practices for Water Quality (BMPs) (VDOF 2011, 2019), and conform to project-specific RPMs set forth in this document. Monitoring would also occur to verify that accuracy of the predicted effects this assessment discloses. Specific monitoring responsibilities and activities include:

The Timber Management Assistant (TMA)/Silviculturist and District Biologist would review the project prior to implementation to ensure that the locations of any access routes, sale boundaries, and the silvicultural prescriptions are carried out as described by this assessment.

The Timber Sale Contract team, primarily the Timber Sale Administrator, would ensure actual operation of the timber sale follows measures described in this assessment.

The District TMA/Silviculturist/Forester/Technicians would survey the stands one year and three years following sale closure to determine if harvest areas have regenerated adequately. In addition to adequate regeneration, the species composition of the regeneration would be monitored. An important part of certifying regeneration would be to monitor for the presence of any non-native invasive species in these areas.

The District TMA/Silviculturist would monitor all temporary road locations, landings and bladed skid roads for at least three years following sale closure to ensure sites are stable and adequately re-vegetated and would monitor control needs of non-native invasive species.

Alternatives Eliminated from Detailed Study

Several alternatives were considered but not proposed for detailed study because they did not meet the project Purpose and Need, were inconsistent with Forest Plan management direction, or were not feasible due to existing conditions in the project area. Potential alternatives that received the most consideration but dropped from detailed analysis are described below.

No Timber Harvest

This alternative was not considered because we would fall short of meeting the need to harvest wood products and contribute to local markets. In addition, the proposed type conversion for wildlife habitat enhancement could not be implemented without the removal of the mature white pine currently on the site.

No Temporary Roads

An alternative was considered that proposed no temporary road development. After preliminary analysis, it was determined the project would fall short of meeting the Purpose and Need without temporary roads. The temporary roads are needed to access the proposed regeneration harvest and type conversion units. Without this access, the project would not contribute to the creation of early successional habitat. Therefore, this alternative was removed from further analysis.

Maximize the Creation of Early Successional Habitat

Public comments proposed an alternative that emphasized the creation of early successional habitat (ESH). This alternative was not considered because, as noted in the Introduction, about 60 percent of the project area is located within the *7E2 Dispersed Recreation Areas - Suitable* Management Prescription. The majority of stands considered for treatment in this Rx do not meet the minimum rotation age for regeneration (Standard 7E2-010) and have been recommended for thinning to open up the canopy and encourage advanced oak regeneration within the understory. The proposed action would increase ESH in the *8E1 Ruffed Grouse/Woodcock Habitat Emphasis* Rx over eight percent for this management prescription. Overall, the amount of ESH across the project area will increase from 146 acres (less than one percent) to 406 acres (about 2.5 percent).

Environmental Effects

The section describes the existing condition of the project area and discloses the anticipated direct, indirect, and cumulative effects of the proposed project. The Project Record provides a central location where project information used in analysis is filed and would remain accessible to the public until a final decision for the project is signed. The Project Record is available for public inspection at the Mt. Rogers NRA Office in Marion, VA.

Resources or Uses Not Present, Outside of Scope of Analysis, or Not Affected

Resources or uses that were not present or directly or indirectly impacted by the alternatives and not further analyzed or whose analysis was out of the scope appropriate for this project include:

- Heritage and Cultural Resources: A Phase 1 reconnaissance archeological survey was completed in the project area. Per Forest Plan direction, the Ewing Mountain project has been designed to avoid, minimize, or mitigate negative effects on potentially significant heritage and cultural resources. Any heritage and cultural resources identified in the project area would be flagged and avoided. In addition, Section 106 compliance clauses would be inserted in contracts and sales documents, and the clauses would be discussed with any parties involved in implementation prior to the initiation of any work. Therefore, it is expected that the project would have no impact on heritage and cultural resources.
- Lands and Special Uses – No Lands or Special Uses issues were identified or analyzed in the Ewing Mountain project area.
- Inventoried Roadless Areas: The 4,722-acre Horse Heaven Inventoried Roadless Area abuts the project area to the west, with Forest Service Road 14 providing the boundary. No harvest activities are proposed within the Horse Heaven IRA as it is intentionally outside of the project area.
- Wilderness: there are no Congressionally-designated Wilderness Areas within or adjacent to the project boundary. Little Dry Run Wilderness lies approximately five miles west of the project. There are no designated or eligible Wild and Scenic Rivers within the project area.

Additional details and analysis describing the resources and uses mentioned above are located in the Project Record.

Forest Plan Desired Conditions

As stated about, the primary purpose of the Ewing Mountain project is to change the current resource conditions and trends to better resemble those described in the Forest Plan. This would be accomplished through vegetation treatments including commercial thinning operations, regeneration harvests, and a clear-cut harvest to facilitate an ecosystem type conversion. This section summarizes the potential impacts of these actions on the major forest communities within the project analysis area. The full analysis can be found in the *Ewing Mountain Forest Communities Specialist Report* (USDA Forest Service, 2021a), the *Ewing Mountain Biological Assessment for Threatened and Endangered Species* (BA) (USDA Forest Service, 2021b), and the *Ewing Mountain Biological Evaluation for Sensitive Species* (BE) (USDA Forest Service, 2021c).

Forest Communities

The entire Ewing Mountain project area is skewed towards older successional stages, with approximately two-thirds of the acres over 80 years old (late successional habitat) and another twelve percent over 130 -140 years old. Current conditions do not meet the Forest Plan objectives to maintain a minimum of four percent of the acreage in habitat that is less than 10 years old (early successional habitat) in the 7E2 *Dispersed Recreation Areas – Suitable* Rx (Objective 7E2-OBJ1) or ten percent of the acreage in the upland project area for the 8E1 *Ruffed Grouse/Woodcock Habitat Emphasis* Rx (Objective 8E1-OBJ1). Together, these two Rx areas represent almost three-fourths of the project acreage and the majority of the treatment areas.

The majority of stands considered for treatment in 7E2 (1,059 acres) do not meet the minimum rotation age for regeneration (Standard 7E2-010) and have been recommended for thinning to open up the canopy and encourage advanced oak regeneration within the understory. This can be reasonably expected to benefit hunting opportunities and watchable wildlife species attracted to the hard and soft mast. There are 48 acres of shelterwood with reserves treatments that have been recommended for stands at rotation age within 7E2; residual basal areas would range from 20 to 40 square feet per acre. Although this would contribute about two percent to the minimum of four percent early successional habitat, this project would not meet that objective as viable opportunities for regeneration harvest within 7E2 are limited in the project area.

Almost thirteen percent of the project area is within the 8E1 *Ruffed Grouse/Woodcock Habitat Emphasis* Rx. There is about 300 acres in this Rx proposed for harvest by clearcutting with reserves; this would increase the amount of early successional habitat to over eight percent for this management prescription. This is short of the ten percent minimum, but an almost ten-fold increase from the current amount of less than one percent. As prescribed in Forest Plan Standard 8E1-018, these clearcut units range from five to twenty acres in size, the optimum size for ruffed grouse. In the short term, the open canopy of these units would optimize soft mast production, and as the sites mature, they would provide dense stands of saplings in the five to twenty year age group for hiding and thermal cover. Approximately 257 acres considered for treatment in 8E1 do not meet the minimum rotation age for regeneration (Standard 8E1-019). As with similar areas within 7E2, they have been recommended for thinning to open up the canopy and encourage advanced oak regeneration within the understory.

Over half of the stands within the project area that fall under the 8E1 Rx would remain in late successional to old growth forest conditions (greater than 100 years old). This is well above the Forest Plan objective to maintain a minimum of ten percent of the area in these stages (Objective 8E1-OBJ2).

Within 7G *Pastoral Landscapes* Rx, one stand totaling 12 acres is proposed for clearcutting of white pine in the Pellbridge pasture allotment. The intent is to convert this pine plantation to a more open, non-forest state and encourage the presence of certain watchable wildlife species

associated with old-field habitat (Standard 7G-001). White pine would be removed, while hardwood and yellow pine species would be retained to provide scattered mast production in the future. Often, there is a hard edge between the forested areas and the pasture fields. Within the forested areas (and specifically the white pine stands), there is typically little understory development except in areas with canopy gaps. Removal of white pine would provide light to help promote the development of the desired vegetation for this prescription, which is predominantly low grasses and wildflowers with some native deciduous and evergreen shrubs interspersed with an occasional tree, hedgerow, or small woodlot. Increasing grassland can provide habitat for species such as golden-winged warbler, loggerhead shrike, orchard oriole, black rat snake, and white-tailed deer.

Management prescription 9H *Management, Maintenance, and Restoration of Forest Communities* represents about eight percent of the project area and contains four stands that are proposed for treatment. Three stands are recommended for thinning (15 acres), and another stand (24 acres) is recommended for a regeneration harvest using coppice with reserves (approximately 25 ft^2 BA of white oak, northern red oak, yellow pine, and chestnut oak retained) to ensure adequate sunlight for oak regeneration (Standard 9H-009). Regenerated stands would help contribute to reaching the desired Standard to ten percent early successional class within this Rx (Standard 9H-004). Additionally, thinnings would favor removal of white pine to promote maintenance and restoration of southern yellow pine forest communities (Standard 9H-005).

If the proposed treatments were not implemented, the stands within the project area would continue to become older, with approximately 65 percent of the forested acreage passing 100 years old in the next ten years. Shade tolerant species in the understory would continue to grow, and over the long-term, gap dynamics would move stands within the project area away from oak dominance to favor more shade tolerant species in the overstory such as red maple, black gum, and in some cases white pine, if treatments are not initiated to counter this shift. On sites of better quality (site index 70 and above for oak), the forest composition would be expected to shift toward red maple and yellow poplar as the oak dies out. This would not be expected to happen for another 100 years or more as natural succession occurs.

Threatened, Endangered, and Regionally Sensitive (TES) Species

The Mt. Rogers NRA supports known occurrences and suitable habitat for several TES species, all of which were considered in the BA or the BE for the project. The BA and BE document the analysis of potential effects of the proposed project to TES species and associated habitat. The results are summarized below; the full BA and BE reports are available on the project website (https://www.fs.usda.gov/project/?project=44665).

Table 3. TES species potentially affected by the Ewing Mountain project

Common Name	Scientific Name	Taxa	TES
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	Mammal	Endangered
Gray Bat	*Myotis grisescens*	Mammal	Endangered
Indiana Bat	*Myotis sodalis*	Mammal	Endangered
Northern long-eared bat	*Myotis septentrionalis*	Mammal	Threatened
Tricolored Bat	*Perimyotis subflavus*	Mammal	Sensitive
Candy Darter	*Etheostoma osburni*	Fish	Endangered
Kanawha minnow	*Phenacobius teretulus*	Fish	Sensitive
Spruce-fir Moss Spider	*Microhexura montivaga*	Arachnid	Endangered
Incurved cave isopod	*Caecidotea incurve*	Isopod	Sensitive
Green-faced clubtail	*Hylogomphus viridifrons*	Dragonfly	Sensitive
Pygmy snaketail	*Ophiogomphus howei*	Dragonfly	Sensitive
Rock Gnome Lichen	Gymnoderma lineare	Lichen	Endangered
Monarch Butterfly	*Danaus plexippus*	Butterfly	Sensitive
American Barberry	*Berberis canadensis*	Plant	Sensitive
Rock Skullcap	*Scutellaria saxatilis*	Plant	Sensitive
Carolina Hemlock	*Tsuga caroliniana*	Plant	Sensitive

Table 4. Conclusions and Determinations for TES species and habitats

Species	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus*	Found in the same county, but outside the range of this species. No potential habitat in the project area	No Effect	This species is found in spruce/fir, spruce, and mixed spruce/northern hardwood forests. None of these forest types exists in the project area. IPaC [4] identified this species in the official species list only because it is listed in the same county as the project area

[4] Information for Planning and Consultation – a U.S. Fish and Wildlife Service online database

Species	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Gray bat *Myotis grisescens*	Project not within range of species	No Effect	Project is in the New River watershed. Gray bats in Virginia are only known to occur in Lee, Scott, and Washington Counties within the upper Tennessee River watershed.
Indiana bat *Myotis sodalis*	Potential habitat present and no current survey conducted.	Likely to adversely affect.	Covered in BO issued by VAFO on January 13, 2004. All R&PM plus T&C followed along with Jefferson Plan Standards for project implementation. Will not exceed incidental take provided.
Northern long-eared bat *Myotis septentrionalis*	Potential habitat present and no current survey conducted.	Likely to adversely affect.	Relying upon the findings of the 1/5/2016 Programmatic Biological Opinion for Final 4(d) Rule on the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions to fulfill our project-specific section 7 responsibilities.
Tricolored Bat *Perimyotis subflavus*	There would be no effect upon this species and this proposed activity will not lead to Federal listing	N/A [5]	VA BMPs for tri-colored bats, specify that forest management activities occurring outside of a two-tiered seasonal buffer zone (250 foot radius December 1 through April 30 and 0.25 miles September 1 through November 30 around known hibernaculum), will not negatively affect habitat for this species

[5] ESA Section 7 consultation is not applicable (N/A) to Forest Service Southern Region (R8) Regional Forest Sensitive species.

Species	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Candy Darter *Etheostoma osburni*	Project is located in a 6th level watershed that contains listed species.	Not likely to adversely affect.	Project will be in compliance with the George Washington and Jefferson National Forests Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan (Kirk and Huber, 2004).
Critical Habitat Candy Darter *Etheostoma osburni*	Critical habitat has been designated for candy darter.	Not likely to adversely modify.	Project will be in compliance with the George Washington and Jefferson National Forests Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan.
Kanawha minnow *Phenacobius teretulus*	"No impact"; this project will not lead to Federal listing, or loss of species viability.	N/A	Project will follow the Forest Plan and be in compliance with the Conservation Plan, which includes specific direction and mitigation measures to protect water quality and aquatic habitat
Spruce-fir Moss Spider *Microhexura montivaga*	Found in the same county, but outside the range of this species. No potential habitat in the project area	No Effect	This species is found in spruce/fir, spruce, and mixed spruce/northern hardwood forests. None of these forest types exists in the project area. IPaC identified this species in the official species list only because it is listed in the same county as the project area
Monarch Butterfly *Danaus plexippus*	This project will not lead to Federal listing.	N/A	Project is considered beneficial to this Sensitive species
Incurved cave isopod *Caecidotea incurve*	This project will not lead to Federal listing, or loss of species viability.	N/A	This species is located in a cave within the Raven Cliff Special Biological area and will not be impacted by project activities.

Species	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Green-faced clubtail *Hylogomphus viridifrons*	"No impact"; this project will not lead to Federal listing, or loss of species viability.	N/A	Project will follow the Forest Plan and be in compliance with the Conservation Plan, which includes specific direction and mitigation measures to protect water quality and aquatic habitat
Pygmy snaketail *Ophiogomphus howei*	"No impact"; this project will not lead to Federal listing, or loss of species viability.	N/A	Project will follow the Forest Plan and be in compliance with the Conservation Plan, which includes specific direction and mitigation measures to protect water quality and aquatic habitat
Rock Gnome Lichen *Gymnoderma lineare*	Found in the same county, but outside the range of this species. No potential habitat in the project area	No Effect	This species is found in spruce/fir, spruce, and mixed spruce/northern hardwood forests. None of these forest types exists in the project area. IPaC identified this species in the official species list only because it is listed in the same county as the project area
American Barberry *Berberis canadensis*	This project will not lead to Federal listing, or loss of species viability. This species was found in the project area.	N/A	Known locations of this species in the project area will be buffered to ensure protection of individuals.
Rock Skullcap *Scutellaria saxatilis*	This project will not lead to Federal listing, or loss of species viability. This species was found in the project area	N/A	Known locations of this species in the project area will be buffered to ensure protection of individuals.

Species	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Carolina Hemlock *Tsuga caroliniana*	This project will not lead to Federal listing, or loss of species viability. This species was found in the project area	N/A	The species was found throughout the project area. Locations with dense regen and individual midstory or taller trees will be protected in the activity areas to ensure that there is not loss of species viability in the project area. Also a proposed harvest stand with a dense concentration of Carolina hemlocks was dropped in the early stages of this project to protect this species.
Bald eagle *Haliaeetus leucocephalus*	Unlikely to disturb nesting bald eagles. Does not intersect with an eagle concentration area.	No Eagle Act permit required.	No Bald eagle nests are known to occur in this area.

Management Indicator Species

The effects of the proposed action on management indicator species (MIS) associated with successional stages of forests are found in table 5. Habitat generalist such as black bear, white-tailed deer, and wild turkey were not chosen as MIS species for the project due to the wide variety of habitats these species use, relatively large home ranges used by individuals, and hunting pressures that affect their overall numbers in the project area. However, all three of these species do benefit from increased habitat diversity that would result from project implementation.

Table 5. Ewing Mountain project MIS

Species	Associated Habitat	Expected effect	Notes
Chestnut-sided warbler *Dendroica pensylvanica*	High-elevation early-successional habitat	Project area populations will benefit from this proposed action	Project will result in an additional 406 acres of early successional habitat being created.

Species	Associated Habitat	Expected effect	Notes
Eastern towhee *Pipilo erythrophthalmus*	Early-successional habitat	Project area populations will benefit from this proposed action	Project will result in an additional 406 acres of early successional habitat being created.
Scarlet Tanager *Piranga olivacea*	Drier mid- to late-successional forest	This species will be displaced from the regeneration harvest units.	Other silvicultural treatments are not expected to impact local populations. Throughout its range this species is considered stable
Pileated Woodpecker *Dryocopus pileatus*	Snags and downed wood	This species will be displaced from the regeneration harvest units.	Other silvicultural treatments are not expected to impact local populations. Throughout its range this species is considered stable
Pine Warbler *Setophaga pinus*	Mid-and late successional pine and pine-oak forest	This species will be displaced from the regeneration harvest units. Thinnings would favor removing white pine, however yellow pines would still provide habitat in these stands	Other silvicultural treatments are not expected to impact local populations. Throughout its range this species is considered stable
Ovenbird *Seiurus aurocapillus*	Interior forest	This species will be displaced from the regeneration harvest units.	Other silvicultural treatments are not expected to impact local populations. Local populations are expected to decline for a 10 to 15 year period until the regeneration areas get older. Overall ovenbird populations are stable or increasing on the Forest
Brook Trout *Salvelinus fontinalis*	Cold water habitat	There would be negligible impact to this species.	The use of the resource protection measures described in Appendix A would result in negligible impact to aquatic biota or aquatic and riparian MIS.

Recreation and Scenic Values

The majority of the Ewing Mountain project area (10,446 acres, or about 60 percent) falls under the Forest Plan Management Prescription (Rx) 7E2 - *Dispersed Recreation Areas – Suitable*. As noted in the Forest Plan, " (t)hese areas receive moderate to high recreation use and are managed to provide a variety of dispersed recreation opportunities, improve the settings for outdoor recreation, and enhance visitor experiences, in a manner that protects and restores the health, diversity, and productivity of the land." Timber harvest can be used in this Rx, provided the "harvest methods used are compatible with the recreational and aesthetic values of these lands."

Recreation resources within the project area include all or part of ten trails, Raven Cliff Furnace, Raven Cliff Campground, Raven Cliff Picnic Area, Collins Cove Horse Camp, and Sunrise Cabin. Though horseback riding occupies the lion's share of recreation activity in the area, other opportunities include hiking, motorcycle riding, mountain biking, driving forest roads, dispersed camping, hunting, and fishing.

Both official Forest Service Trails (FST) and unauthorized routes are abundant in the project area. The proposed vegetation treatments would expand the amount of existing early successional habitat and increase the opportunities for wildlife viewing in the back country. This would also increase habitat for game species and the associated hunting opportunities. Project resource protection measures (RPMs) have been developed to lessen the direct impact to visitors and to preserve authorized recreation opportunities.

However, there is concern that access routes developed for the timber sale would continue to be used as unauthorized trails and further contribute to erosion and sedimentation. There are currently several known unauthorized horse trails that have resulted in resource damage such as trail gullying, loss of riparian vegetation, and stream channel impacts through trampling and hoof action, and chronic erosion off certain portions of trail. In locations where unauthorized use overlaps with proposed treatments, any current resource impacts would be addressed by mitigation efforts implemented subsequent to the proposed action. Per RPM RSRL-4 (Appendix A), efforts would be taken to locate access in pre-existing disturbed areas that would be closed and revegetated at the conclusion of the treatment. This would be implemented in conjunction with education efforts to inform the public of the impacts associated with unauthorized use. Current system trail opportunities would be highlighted and future trail routes could be considered for addition to the system under a separate analysis and decision.

Effects to system trail opportunities would be most acutely felt along the Virginia Highlands Horse Trail (FST 337) and the Moore Trail (FST 4615). These effects are expected to be short-term; most would cease once harvesting activities have been completed. The same can be said for less affected trails and recreation sites within the project area.

The project Visual Quality RPMs are designed to protect the scenic integrity of the treatment areas and mitigate the effects of treatments on recreation opportunities. These measures include the retention of screening vegetation along roads and trails in areas of high or moderate scenic integrity and higher vegetation densities adjacent to certain travel routes. Visually sensitive units would avoid straight lines, geometric shapes, and abrupt edges when vegetation is cut.

It would make little difference to recreation opportunities in the project area if the proposed treatments were not implemented. There would be no opportunity to expand the existing unauthorized trails along access developed for the proposed treatments, but also no opportunity to address the erosion and sedimentation associated with this current unauthorized use within the treatment areas. Visual quality would remain the same in the absence of disturbance and would continue to follow existing vegetation trends.

The full detailed analysis of effects to recreation opportunities and visual quality can be found in the *Ewing Mountain Recreation Report* (USDA Forest Service, 2021d) and the *Ewing Mountain Visual Analysis Report* (USDA Forest Service, 2021e).

Soils and Watersheds

This section summarizes the analysis of soil and water quality impacts within the project area. The full detailed analysis can be found in the *Ewing Mountain Soil and Water Resources Report* (USDA Forest Service, 2021f), the *Ewing Mountain Geology Report* (USDA Forest Service, 2021g), and the *Ewing Mountain Fisheries and Aquatic Habitat Specialist Report* (USDA Forest Service, 2021h).

Soils

The proposed actions for the Ewing Mountain Vegetation Project are expected to produce detrimental soil disturbance within limits established by the Forest Plan. The threshold is established in Forest-wide Standard FW-5 which states

> "*On all soils dedicated to growing vegetation, the organic layers, topsoil and root mat will be left in place over at least 85% of the activity area and revegetation is accomplished within 5 years*."

The risk of detrimental soil disturbance was estimated at approximately 2 to 47 acres short-term (within two years of activity) and 2 to 32 acres long-term (more than two years following activity), which translates to a maximum of eleven percent of the activity area affected by short-term impacts and eight percent affected by long-term impacts. This was determined through a geographical information system (GIS) data analysis of the preliminary logging plan for the project, which included temporary roads, skid roads, and log landings for the harvest units. The expected effects, although detrimental, are not significant and would be mitigated through the application and inclusion of the Forest Plan and project level RPMs described in Appendix A.

Due to the mountainous nature of the terrain in the project area, some of the proposed treatment units contain slopes greater than 35 percent grade. Forest-wide Standard FW-1 and Virginia's Forestry Best Management Practices for Water Quality (BMPs) (VDOF 2011, 2019) restrict heavy equipment operation to slopes below this threshold. Field verification prior to treatment implementation would identify steep slopes within units and harvesting operations would avoid traversing or skidding with heavy equipment in these areas. This avoidance would limit short- and long-term soil disturbance and reduce the risk of soil instability.

If the proposed treatments were not implemented, there would be no associated disturbance and soil conditions and slope stability would remain unchanged, however, current trends associated with ongoing impacts would remain unaddressed.

Water Quality

It is anticipated that water quality may be marginally affected by sediment loading over the short-term, but measurable long-term water quality effects resulting from the proposed action should be mitigated or avoided by the proposed RPMs in Appendix A. The use and construction of system and temporary roads, skid roads[6], and log landings increases the risk of sediment entering the stream system during pulses of wet weather, so they should be constructed to minimize impacts to surface hydrology. This increased risk is expected from storm events during implementation and after sale areas close but before herbaceous vegetation is established; the risk diminishes considerably after about two growing seasons. Sediment loading in streams affects water quality directly through increases in turbidity or total dissolved solids, and indirectly by increasing water temperature and other parameters.

Long Branch Road (FSR794) in the southeast of the project area (Map 8, C4976) has two failing culvert crossings and the end of the road has been obliterated by flood flows. The entire 1.1 mile length of this road would be decommissioned, and the rehabilitation of approximately 0.8 miles below the saddle would reduce the risk of sedimentation of the adjacent perennial creek. A culverted channel crossing on Tate Road (FSR667) is planned for aquatic organism passage (AOP) improvement. This involves replacing an existing undersized culvert with a larger, bottomless arch structure to improve aquatic organism movement and the flood resilience of the road stream crossing. An upgrade of an existing crossing on Lick Branch Road (FSR690) is also planned for improvements to stream health and flood resilience of the road stream crossing. In the short term, site access, excavation, stockpiling, and construction activities increase risk of sediment delivery to the stream channel at these locations. Excavation activities may occur in moist soils immediately adjacent to the stream channel which elevates the risk of sedimentation, however, after two years it is expected that vegetation would have stabilized any disturbed soil.

[6] For this analysis, the term skid roads is used for bladed surfaces; the effects of overland (non-bladed) skid trails were not quantified.

Immediately after construction is completed, the risk of erosion and sedimentation due to flood damage of the crossings would be reduced as the new structures would be designed and constructed to accommodate larger flow events.

Water quality is not expected to be affected by herbicide use under the proposed action; Forest Plan Standard FW-100 requires a buffer of 30 linear feet from streams when applying herbicide. Only ground-based application methods (basal bark or low volume foliar spray) would be used on the project.

Potential water quality effects would be spread out over time, with vegetative recovery establishing quickly post-harvest, minimizing effects to soil and water resources. However, there would be no impacts to soil and water resources without the proposed treatments. Current trends for erosion and sedimentation would remain the same. This would mean that the effects from the two failing culvert crossings in the Long Branch Road area would continue and that there would be no stream health improvements along Tate Road and Lick Branch Road.

Invasive Species

Non-native invasive plant species (NNIS) threaten the integrity of native ecosystems on the Jefferson National Forest; this issue was raised in public comments on the project and during internal discussions. The development of the proposed management activities included consideration of existing and potential undesirable plant species, which include non-native invasive plant species. Site-specific control efforts include control/eradication treatments and follow-up monitoring of those treatments to ensure effectiveness. Areas of focus include: log landings, skid roads, haul roads, and areas near existing seed sources where soil disturbing activities are proposed.

Several non-native invasive species have been identified to some extent in and adjacent to the proposed harvest units, areas of proposed temporary road construction, and along existing roads. Many of these species are sun-loving plants that require sunlight to grow and flourish. Species seen during field visits include include tree-of-heaven (*Ailanthus altissima*), autumn olive (*Elaeagnus umbellata*), Japanese honeysuckle (*Lonicera japonica*), garlic mustard (*Alliaria petiolata*), multiflora rose (*Rosa mutiflora*), paulownia (*Paulownia tomentosa*), and tall fescue (*Schedonorus arundinacea*).

The potential to introduce or increase the presence of invasive non-native plants in this project area is related to the amount of acres harvested. Tree-of-heaven does not need full sunlight to establish itself; it is a windborne seed that can become established in partial shade. While individuals of tree-of-heaven and other NNIS tree, shrub and vine species may become established and/or grow in the harvest units, they are not expected to dominate the stand, nor are they expected to comprise a significant component of the stands as basal bark herbicide treatments are planned as a control measure If they were to gain a foothold in the stands, some

would eventually be shaded out by competing native species and most would not reach the upper canopy. Ultimately, the forest composition in these stands would not change significantly.

Autumn olive and garlic mustard are shade tolerant species, and are generally associated with the road system, including the roadsides and roadbed itself. Pre-haul and post treatment of the roadside edges within the project area would reduce the potential of spread of existing populations of NNIS plants. The spread of these types of invasive species can also be reduced by quickly seeding disturbed areas with non-invasive species or the use of native grasses and wildflowers beneficial as wildlife foods. Also, the potential spread and establishment of NNIS would be mitigated by requiring logging equipment to be inspected and free of soil, seeds, and other attached material before entering onto National Forest ownership (Appendix A, IS-2).

Herbicide use is proposed for NNIS treatments and to release desirable trees from competition. These treatments would be directional foliar or basal application on undesirable species in direct competition with desirable tree species. The primary herbicide used would be triclopyr, with possible application of glyphosate, following appropriate label uses and application rates.

Based on the current known populations of NNIS in the project area, this proposal would not result in a significant long-term infestation of invasive species. To reduce the risk of the establishment and spread of invasive species, resource protection measures, as described and referenced in Appendix A, would be followed.

Without the proposed treatments, the past establishment and spread of non-native invasive species would continue to occur through the creation of canopy gaps that result from natural tree mortality or catastrophic natural events. However, non-native species along the roadsides would continue to be treated under the decision space of the *Forest-Wide Non-Native Invasive Plant Control Environmental Assessment* (USDA Forest Service, 2010).

Karst

During project development, the Raven Cliff karst area and 4C1 *Geologic Areas* Management Prescription (Rx) were identified in the project area. This management Rx is classified as unsuitable for timber production, and no treatments were proposed with it. However, an access route was initially planned through this prescription. Further analysis and discussion lead to the conclusion that construction of a temporary road was not permitted and access for the proposed treatments was rerouted outside of the 4C1 areas. Because of these changes, it is expected that there would be no significant effect to the Raven Cliff karst area or the 4C1 Rx.

About twenty percent of the project area has been identified as karst, a type of geological terrain where underground dissolution of the bedrock creates sinkholes, sinking streams, caves, springs, underground streams, aquifers with large flows of groundwater, and other features. This karst is

on the northern end of the project area and the southeastern edge of a large expanse of karst in the Great Valley of Virginia.

In karst terrain, sediment from surface sources has the potential to infiltrate into the groundwater. The proposed timber harvest unit C4970 S87 in the Cripple Creek area (Map 3, C4970 North) would be karst terrain, as would unit C4970 S55, south of Fry Hill (Map 2, C4970 Central). The north end of an abandoned mine highwall extends into unit C4970 S55 and the portion of the harvest unit west of the highwall and the proposed log landing are in highly disturbed abandoned mine land. The proposed timber harvest activities have the potential to adversely affect groundwater through sedimentation in these areas, but it can be reasonably expected that the effects will not be significant due to implementation of Forest Plan and project-level protection measures as described in Appendix A. These include 200 foot buffers around karst features such as caves and sinkholes, Virginia's Forestry Best Management Practices for Water Quality (BMPs) (VDOF 2011, 2019), and silt fence installation, rapid revegetation, spot gravelling and temporary stabilization measures where needed. The full detailed analysis can be found in the *Ewing Mountain Geology Report* (USDA Forest Service, 2021g).

Climate Change and Carbon Storage

During the initial public scoping of proposed projects, the Forest Service is often asked to "consider climate change". Climate change has not been a primary driver of project consideration or selection, however, it is assumed that one of the benefits of a restoration focused project is an increase in the health and resilience of the targeted ecosystems. Resilience is the ability of an ecological system to absorb disturbances while retaining the same basic structure and ways of functioning; the capacity for self-organization; and the capacity to adapt to stress and change such as an increase in mean annual temperature or a shift in the amount, timing, or intensity of annual precipitation.

The Forest Service also considers climate change in the context of carbon storage and release. Increase in mean annual temperature is associated with higher concentrations of greenhouse gasses (GHG) in the atmosphere. Major greenhouse gases include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, and perfluorocarbons. Carbon dioxide is captured by growing plants through the process of photosynthesis and stored in biomass (plant stems, branches, foliage, roots). Much of this organic material is eventually incorporated and stored in forest soils.

As part of the planning process for this project, the Forest Service analyzed the potential to influence the exchange of carbon between the forest and the atmosphere, either by increasing storage or releasing carbon emissions. This analysis was done at two scales – the project level and the Forest level. It was determined that the total proposed harvest on approximately 1,782 acres represents less than one percent of the 1.1 million acres on the GWJNFs and that the scope and degree of change would be minor. Carbon would be removed from the atmosphere over time

as the forest regrows, and the captured carbon in the harvested wood may be stored for up to several decades. Wood products may also substitute for more emission intensive or fossil fuel-based materials or energy sources. The full detailed analysis can be found in the *Ewing Mountain Vegetation Project Project-scale Carbon Effects Report* (USDA Forest Service, 2021i) and the *Forest Carbon Assessment for the George Washington and Jefferson National Forests in the Forest Service's Southern Region* (USDA Forest Service, 2019).

Cumulative Effects

The environmental assessment for this project analyzes the direct and indirect effects of the proposal and considers if the effects would be significant in the context of past actions, represented by the existing conditions, and other reasonably foreseeable current and future actions.

An example is the current impacts from sedimentation in Killinger Creek. Killinger Creek is tributary to Cripple Creek, which contains designated critical habitat for the Federally endangered candy darter (*Etheostoma osburni*). The Glade Mountain abandoned mine site drains to Killinger Creek and a portion of the remediation infrastructure has failed over time, allowing gully incision and erosion of post-mining valley fills. This has resulted in significant pulses of sediment to entering the creek less than two miles downstream from the proposed Ewing project area. To avoid a cumulative impact from the proposed Ewing project activities, RPM Soil -5 (Appendix A) was added to delay the sale of any units within the Cripple Creek watershed until it has been determined that the current mitigation actions at the Glade Mountain site are effective at reducing the risk of erosion and sedimentation.

Prescribed fire is not an activity included in this proposed action, but is a potential future activity that would have cumulative effects in the project area. Much of the project area is mixture of pine/oak/hickory habitats that would have a naturally have frequent fires. Prescribed fire would contribute towards restoring the natural fire regime to these habitat types and improving habitat conditions for fire adapted species. Establishing fire control lines does pose a risk increased erosion and sedimentation, but recent research on the Forest showed no change in water quality following a wildfire event that burned the entire watershed (Downey and Haraldstadt 2013). Additionally, prescribed fire is typically of low to moderate intensity and does not produce adverse effects to soil or water quality (Caldwell 2020). Based on previous monitoring, recent research, and plan standards, there would be limited direct and indirect effects and negligible cumulative effects to water quality and soils from prescribed burning

Livestock grazing has the potential to impact aquatic resources in numerous ways. Adherence to the allotment management plan standards and conditions, along with allotment monitoring, can minimize cumulative effects on soil and water resources. Outstanding allotment plan requirements, such as fencing a spring in the Cold Run watershed, would reduce cumulative

effects to soil and water resources and should be implemented prior to, during, or immediately after, timber harvest operations in the Pellbridge unit.

As noted in the Ewing Geology report, there is a detention dam filled with sediment from historic mining operations within the Pellbridge grazing allotment, adjacent to unit C4970 S87 (Map 3, C4970 North). This unit is proposed for type conversion from white pine plantations to a more open, non-forest state associated with old-field habitat. In the short term (approximately two growing seasons), this treatment would increase the amount of surface flow runoff flowing into the pasture above and to the east of the detention dam. Initial analysis determined that the estimated amount of runoff did not pose a significant risk to this structure and that the risk would diminish as vegetation became more established in the unit. This area has been proposed for a field inspection and evaluation to determine if there is further cause for concern.

Finding of No Significant Impact

The responsible official is responsible for evaluating the effects of the project relative to the definition of significance established by the CEQ Regulations (40 CFR 1508.13). Following review and consideration of the EA and documentation included in the project record, the responsible official determined that the proposed action will not have a significant effect on the quality of the human environment. As a result, no Environmental Impact Statement (EIS) will be prepared. Rationale for this finding is as follows, organized by sub-section of the CEQ definition of significance cited above.

Context

For the proposed action, the context of the environmental effects is based on the environmental analysis in this EA. The Ewing Mountain Vegetation Project area covers approximately 17,200 acres located in Grayson, Wythe, and Carroll Counties, Virginia. Some of the project's effects, such as noise from machinery, and additional traffic will be experienced beyond the project boundary. However few, if any, effects will be noticeable or measurable beyond the localized vicinity. Both short-term and long-term effects of the proposed action were found to be of limited extent and are not expected to affect national resources or the human environment. The project was designed to minimize environmental effects through the Forest-wide common standards stated in the Forest Plan and the additional measures described in the Project Resource Protection Measures (Appendix A) section of this EA.

This decision is consistent with similar activities implemented in the past by the George Washington and Jefferson National Forests (GW-Jeff NFs), which trend toward achieving the desired conditions in the Forest Plan, while meeting the purpose and need of the EA. The project does not have international, national, regional, or state-wide importance. The physical and biological effects of the selected actions were analyzed at appropriate scales, such as within the project area, adjacent to the project area, or across a larger landscape.

Intensity

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of this EA and the references in the project record. The effects of this project have been appropriately and thoroughly considered with an analysis that is responsive to concerns and issues raised by the public. The agency has taken a hard look at the environmental effects using relevant scientific information and knowledge of site-specific conditions gained from field visits. My finding of no significant impact is based on the context of the project and intensity of effects using the ten factors identified in 40 CFR 1508.27(b).

1. **Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.**

   The Interdisciplinary (ID) team analyzed the direct, indirect, and cumulative effects of the proposed action on biological, physical, and cultural resources in and around the project area. As disclosed in the *Environmental Effects* section of this EA, all adverse impacts are minor and of low intensity. Design features and other protection measures have been agreed upon by the ID team to ensure that even short-term impacts to these resources will not be significant.

   These analyses contribute to the understanding of the effects of the proposed action and confirm that there will be no significant impacts to those resources. Beneficial effects were not used to counterbalance adverse impacts in determining the significance of impacts on the environment. Consideration of the intensity of environmental effects is not biased by beneficial effects of the action.

2. **The degree to which the proposed action affects public health or safety.**

   There will be no significant effects on public health and safety because all safety precautions will be followed, including signs and notices during project operations, and restrictions on access when required. Workers will wear protective equipment and clothing and will follow Forest Service safety requirements.

   Particular attention was paid to the Pellbridge detention dam due to concerns raised from a remotes sensing analysis of the area. A field visit by Forest Service specialists confirmed that the dam has been stable for over forty years as the berm and spillway appear to have been effective since their estimated installation in the 1980s. They did not observe any signs of instability or indications of tension cracks or scarps that would indicate an immediate risk of mass failure. The short-term increase in run-off due to the type-conversion treatment is not expected to be substantial enough to make a difference to the current function and is expected to decrease over the long term as the pastoral vegetation becomes established and infiltration rates increase. It was agreed that the Forest should consult the State of Virginia Department of Mines, Minerals, and Energy

(DMME) to determine if a mitigation effort would be required in the future. Further discussion with the ID Team led to the conclusion that the proposed type conversion could increase the current risk incrementally, but not significantly.

3. Unique characteristics of the geographic area such as the proximity to historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There will be no significant effects on unique characteristics of the area. There are no parklands, prime farmlands, or wild and scenic rivers affected by the project.

The Raven Cliff karst area and its *4C1 Geologic Areas Management Prescription* (Rx) are located within the project area. No timber cutting or road building is proposed in this Rx. Forest-wide and 4C1 Rx standards in the Forest Plan provide protection measures for caves and other karst features within the project area.

Cripple Creek, downstream from the project area, contains the federally endangered candy darter and is identified as designated critical habitat for the candy darter (*Etheostoma osburni*). The proposed action is "not likely to adversely effect" the candy darter and there will be no destruction or adverse modification to proposed critical habitat.

Wetlands within or adjacent to treatment areas will be identified before implementation and a streamside management zone will be designated around all wetlands. Direct and indirect effects for all resource indicators show that minor effects to wetland resources will occur. These effects are expected to be localized in nature, and monitoring pre/post implementation will not likely show a discernable change in the resource conditions as appropriate Forest Plan standards and guidelines and resource protection measures would be implemented. There will be no significant effects on wetlands or ecologically critical areas

There will be no significant effects on unique characteristics such as historical or cultural resources when the recommended resource protection measures are implemented prior to and during the proposed treatments. The Forest Archaeologist may also approve additional measures to further protect sites.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The effects on the quality of the human environment are not likely to be highly controversial and the best available science was considered in making this decision. Effects analysis was conducted using scientific literature cited in the *Literature Cited*

section of this EA. The proposed action with the identified design criteria meets Forest Plan direction.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.**

   The Forest Service has considerable experience with projects that are similar to the proposed action. Analysis of the proposed action considered the effects of past actions as a frame of reference, in conjunction with scientifically accepted analytical techniques, available information, and best professional experience and judgment, to estimate effects to the human environment. This analysis shows the effects are not uncertain, and do not involve unique or unknown risk.

6. **The degree to which the action may establish precedent for future actions with significant effects or represents a decision in principle about a future consideration.**

   The proposed activities are similar in nature and effects to many other projects on the Mount Rogers National Recreation Area and surrounding Ranger Districts and are consistent with the Forest Plan. This action does not represent a decision in principle about a future consideration. Any proposed future project must be evaluated on its own merits and effects. The action does not establish a precedent for future actions with significant effects because the project is an independent action that has no bearing on any other actions.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.**

   The cumulative impacts to each resource have been fully analyzed and were not found to be significant. Past, present, and reasonably foreseeable activities that may be relevant to the cumulative effects analysis for each resource were evaluated by each specialist to determine which actions were relevant to their analysis. The individual specialist reports and the analysis in this EA indicate that there will be no significant cumulative effects.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.**

   There are no districts, sites, highways, structures, or objects listed on or eligible for the National Register of Historic Places within the Ewing Mountain Vegetation Project area.

Resource protection measures will be implemented so that no loss or destruction of significant scientific, cultural, or historic resources will occur.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

A biological assessment has been prepared to document the effects of the proposed action on threatened and endangered aquatic and terrestrial wildlife species. Consultation with the U.S. Fish and Wildlife Service (USFWS) was concluded on May 27, 2021. The USFWS concurred with the determination that the proposed action is not likely to adversely affect the Federally threatened candy darter (*Etheostoma osburni*) or designated candy darter critical habitat and that the federally listed endangered Indiana bat (*Myotis sodalis*) is likely to be adversely affected. The 1,834 acres of vegetation disturbance proposed for this project over 10 years does not exceed the take coverage from the 2004 Biological Opinion, therefore, these activities are covered. Additional monitoring and/or mitigations may be instituted for threatened or endangered species based on continued coordination with the USFWS. The Forest Service will comply with any conservation measures resulting from this consultation process.

The biological assessment concluded that the project:

- Candy darter (*Etheostoma osburni*) - This project is **not likely to adversely affect** the candy darter; the project will be in compliance with the *George Washington and Jefferson National Forests Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan* (Kirk and Huber, 2004). There will be no destruction or adverse modification to proposed candy darter critical habitat; it is **not likely to adversely modify** designated candy darter critical habitat.

- Indiana bat (*Myotis sodalis*) - This project is **likely to adversely affect** the Indiana bat; however, there are no effects beyond those previously disclosed in the Biological Assessment dated August 19, 2003 during formal consultation of Forest Plan activities with the USFWS, which resulted in a Biological Opinion (BO) and Incidental Take provisions. Since the implementation of this project will be in compliance with the BO, adheres to Forest Plan standards designed for the protection of the Indiana bat, is within annual Incidental Take provisions, is not within 2 miles of known hibernacula and/or maternity colonies, or within ¼ mile of known individual roost trees, further Section 7 consultation is not necessary for the Indiana bat, according to the USFWS BO terms and conditions 2(a) and (b).

- Northern long-eared bat (*Myotis septentrionalis*) - This project is **likely to adversely affect** the northern long-eared bat; however, there are no effects

beyond those previously disclosed in the programmatic biological opinion on implementing the final 4(d) rule dated January 5, 2016. Any taking that may occur incidental to this project is not prohibited under the final 4(d) rule (50 CFR §17.40(o)) issued on January 14, 2016. This project is consistent with the Forest Plan, the description of the proposed action in the programmatic biological opinion, and all project activities are excepted since they are more than ¼ mile from a known hibernaculum and more than 150 feet from known occupied maternity roost trees.

- Will have **no effect** on Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*), gray bat (*Myotis grisescens*), spruce-fire moss spider (*Microhexura montivaga*), Roan Mountain bluet (.*Hedyotis purpurea* var. *montana*), or rock gnome lichen (*Gymnoderma lineare*).

- **May impact but is not likely to cause a trend towards federal listing** for eastern small-footed bat (*Myotis leibii*), tricolored bat (*Perimyotis subflavus*), monarch butterfly (*Danaus plexippus*), American barberry (*Berberis canadensis*), rock skullcap (*Scutellaria saxatilis*), or sweet pinesap (*Monotropsis odorata*).

- Will have **no impacts** on Kanawha minnow (*Phenacobius teretulus*), incurved cave isopod (*Caecidotea incurve*), green-faced clubtail (*Hylogomphus viridifrons*), or Carolina hemlock (*Tsuga canadensis*).

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The action will not violate Federal, State, and local laws or requirements for the protection of the environment. Applicable laws and regulations that were considered in the EA include Virginia's Department of Environmental Quality regulations for air and water quality monitoring and protection, the Clean Air Act, the Clean Water Act, the Endangered Species Act, and the National Historic Preservation Act. Each of these is discussed in the relevant resource specialist's report. The action is also consistent with the Forest Plan.

Agencies & Organizations Consulted

The Forest Service consulted the following Federal, state, and local agencies and organizations during the development of this Environmental Assessment:

- Eastern Band of Cherokee Indians
- Cherokee Nation
- United Keetoowah Band of Cherokee
- U.S. Fish and Wildlife Service, Southwest Virginia and Virginia Field Offices
- Virginia Department of Wildlife Resources
- Virginia Department of Conservation & Recreation, Division of Natural Heritage

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Appendix A.

Project Resource Protection Measures (RPMs)

Cultural and Heritage Resources (CHR)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-204, FW-210.

2. No actions will take place within the boundaries of National Register of Historic Places (NRHP) eligible or unevaluated sites that would have an adverse effect on the site.

3. If human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during project implementation, the requirements of Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3002(d) and regulations (43 CFR 10) shall be followed.

Invasive and Undesirable Species (IS)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-35, FW-86, FW-87, FW-88, FW-89, FW-90, FW-93, FW-94, FW-95, FW-96, FW-101, FW-102, FW-103, FW-104, FW-105, FW-106, FW-107, FW-108, MA Rx *7B - Scenic Corridors* Standard 7B-006, MA Rx *7G - Pastoral Landscapes* Standard 7G-002, MA Rx *8E1- Ruffed Grouse/Woodcock Habitat Emphasis* Standard 8E1-015, and MA Rx *9H - Management, Maintenance, and Restoration of Forest Communities* Standard 9H-007.

2. To avoid the spread and establishment of non-native invasive species, logging equipment will be inspected and free of soil, seeds, and other attached material before entering onto National Forest lands.

3. Revegetation of disturbed areas is accomplished with a Forest Service approved seed mixture, with preference given to native grasses and wildflowers.

Karst and Geologic Resources (Karst)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-63, FW-65, FW-106, FW-111, FW-214, FW-215, FW-216, and MA Rx *4C1- Geologic Areas* Standards 4C1-001, 4C1-016, 4C1-017.

Recreation (REC)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-156. FW-158, FW-159, and MA Rx *8E1 - Ruffed Grouse/Woodcock Habitat Emphasis* Standard 8E1-021.

2. Coordination will occur with Forest Service personnel prior to implementing treatments in order to protect system trails, the trail prism associated with each of these trails, and trailhead improvements from damage during or after treatment. If damage is possible, post-treatment standards and responsibilities for mitigation of damage will be identified.

3. All recreational signing (i.e., trail carsonite markers, roadside informational signs, kiosks, etc.) will be protected during all treatment implementation.

4. When possible, access to developed and dispersed campsites, roads, and system trails should be maintained during implementation of all treatments. Where this is not possible due to safety, coordination will occur with local Forest Service personnel to provide this information to the public, provide adequate signing and traffic management, and provide protection of these sites.

5. Extended-use of camping sites during implementation of treatments by people other than Forest Service personnel will be by permit, with stipulations regarding post-use site conditions.

6. Posting of interpretive messages about forest restoration treatments should be considered at campgrounds and trailheads before, during, and after treatment implementation.

Roads, Skid Roads, and Landings (RSRL)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-8, FW-9, FW-10, FW-16, FW-20, FW-21, FW-88, FW-125, FW-126, FW-127, FW-128, FW-129, FW-130, FW-131, FW-132, FW-133, MA Rx *4C1- Geologic Areas* Standards 4C1-016, 4C1-017, MA Rx *9A1 - Source Water Protection Watersheds* Standard 9A1-001, and MA Rx *11- Riparian Corridors* Standards 11-001, 11-002, 11-045, 11-046, 11-047, 11-048, 11-049, 11-050, 11-051, 11-052, 11-053, 11-054.

2. Temporary roads, skid roads, stream crossings, and landings will adhere to the guidance in Virginia's Forestry Best Management Practices for Water Quality (VDOF 2011, 2019).

3. Cautionary signing and/or traffic control will be implemented during operations and log hauling as specified under timber sale and service contract provisions.

4. Temporary roads, skid roads, skid trails, landings, and staging areas will be pre-located or approved by Forest Service personnel. Efforts will be taken to locate these areas on pre-existing disturbed sites if overriding sensitive characteristics or situations are not present.

5. Skid roads, skid trails, off-road vehicular use, staging of vehicles and equipment, and landings should not be located in the streamside management zone (SMZ). Landscape depressions (e.g. swales and meadows), slopes greater than 15 percent gradient, and other sensitive soils (e.g. highly erodible soils, gullied sites, etc.) should be avoided. When possible, conduct activities associated with concentrated mechanical use on previously disturbed sites.

6. Avoid side-casting soils, snow, and other materials into streams, springs, or wetlands when constructing or maintaining roads.

7. Plan stream crossings carefully, and minimize the number of stream crossings. Streams should be crossed at a right angle to the channel. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

8. Existing drainage structures (e.g., rolling dips, culverts, rock crossings, etc.) will be maintained to be functional throughout the project and will be repaired and restored as quickly as possible if damaged or impaired.

9. Lead-out ditches will be maintained in a manner that does not allow sediment-laden runoff to enter stream courses or drainages.

10. Forest Service personnel will determine if additional drainage structures are needed.

11. Road maintenance will concentrate on improving drainage. Road drainage measures will not channel run-off directly into stream courses. This includes out-sloping the road and maintaining leadoff ditches.

12. Route road drainages away from potentially unstable stream channels, fills and hillslopes; or, if this is not possible, mitigate the effects.

13. Avoid disruption of natural hydrologic flow paths.

14. When all proposed activities requiring access are completed, temporary roads, skid roads, and landings will be closed to vehicle traffic and seeded with a Forest Service approved seed mixture to prevent erosion, provide wildlife habitat, and increase visual quality.

15. Upon the completion of the project, all temporary road drainage structures will be removed, and the natural drainage patterns will be restored as part of the closures of the temporary roads, skid roads, and landings.

Soils and Hydrology (SOIL)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-1, FW-5, FW-8, FW-9, FW-10, FW-12, FW-13, FW-14, FW-16, FW-20, FW-21, FW-27, FW-111, FW-118, FW-129, FW-132, MA Rx *8E1 - Ruffed Grouse/Woodcock Habitat Emphasis* Standard 8E1-001, MA Rx *9A1 - Source Water Protection Watersheds* Standard 9A1-001, and MA Rx *11 - Riparian Corridors* Standards 11-001, 11-002, 11-045, 11-046, 11-047, 11-048, 11-049, 11-050, 11-051, 11-052, 11-053, 11-054.

2. Forest Plan Forest-wide Water and Soil Quality Standard 1 (FW-1) requires that management activities that may affect soil and / or water quality adhere to Virginia's Forestry Best Management Practices for Water Quality (VDOF 2011, 2019). The following sections of the VA BMP manual are relevant to the project:

    - Skid Trails
    - Stream Crossings
    - Log Landings
    - Erosion Control Measures
    - Revegetation

3. Enhanced BMPs, including (but not limited to) silt fence installation, rapid revegetation, spot gravelling and temporary stabilization measures during wet weather conditions, may be implemented on any treatments within the Brush/Little Brush Creeks, Cold Run, and Cove Branch watersheds. The focus will be on the reduction of sediment from the road system and logging plan features that were identified as potential sources of sediment loading and specific measures will be based on recommendations by Forest Service personnel.

4. Close temporary roads and skids roads with enough jack-strawed trees and slash, or other means, to effectively prevent unauthorized vehicle or horse use, where necessary. This is specifically a concern where existing non-system horse trails are proposed as project temporary roads or skid roads/trails, or where they intersect. Signage and effectiveness monitoring may also be required.

5. No units will be sold within the Cripple Creek watershed until after the Virginia Department of Mines, Minerals, and Energy; Division of Mineral Mining Glade Mountain Reclamation Project* is completed and has been determined effective at reducing the risk of erosion and sedimentation into Killinger Creek. This determination

* The Forest Service refers to this project as the Killinger Creek Mine Restoration and Mitigation Project. A Decision Memo approving this project was signed on August 3rd, 2020 and is available in the Ewing Mountain project record.

will be made by the appropriate George Washington – Jefferson NF staff in consultation with the Forest Fisheries Biologist, Forest Hydrologist, and / or Forest Soil Scientist. These units include (C4971 S7); (C4971 S8); (C4971 S14); and (C4971 S17). All are found on Map 4, Compartment 4971.

6. MA Rx *9A1 - Source Water Protection Watersheds* Standard 9A1-001 is pertinent in units (C4978 S13, Map 10); (C4978 S17, Map 10); (C4978 S19, Map 10); (C4979 S4, Map 11); and (C4979 S8, Map 11)[7]. No timber harvest will occur in the extended stream management zone buffers of these units to protect drinking water for the community of Austinville, Virginia.

Vegetation (Veg)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-10, FW-32, FW-33, FW-74, FW-75, FW-76, FW-128, MA Rx *7E2 - Dispersed Recreation Areas – Suitable* Standard 7E2-009, MA Rx *8E1 - Ruffed Grouse/Woodcock Habitat Emphasis* Standards 8E1-001, 8E1-004, 8E1-009, 8E1-017, 8E1-021, and MA Rx *9H - Management, Maintenance, and Restoration of Forest Communities* Standard 9H-003.

2. Prior to project implementation, consult with a knowledgeable Forest Service specialist (e.g. Botanist, Ecologist, Silviculturist) to ensure known locations of target Forest Service Southern Region (R8) regionally sensitive plant species are properly protected.

3. Slash piles should be at least 10 to 20 feet away from known populations of R8 regionally sensitive plants. Consider placing slash piles on previously disturbed locations, such as old piling sites or old log deck sites, to avoid disturbance to additional locations where possible.

4. The following R8 sensitive plants will receive buffers from timber harvest activities and herbicide treatment unless it is deemed beneficial for the species by Forest Service specialists:

    a. Rock Skullcap (*Scutellaria saxatilis*) - 100 feet from center of location
    b. American Barberry (*Berberis canadensis*) - 50 feet from center of location
    c. Carolina Hemlock (*Tsuga caroliniana*) – for trees greater than 10 feet in height, a tree length buffer will be used to protect individuals from timber harvest

[7] Units (C4971 S1, Map 4); (C4971 S2, Map 4); and (C4978 S2, Map 10) will require field validation at layout to confirm that no extended riparian buffers are present and therefore not subject to Standard 9A1-001.

activities. Regeneration patches of Carolina hemlock greater than or equal to 0.25 acre will be exclusion zones from timber harvest.

5. No units will be sold prior to the completion of old growth surveys in all proposed logging units within that sale. Any areas of old growth identified by a knowledgeable Forest Service specialist according to the GWJNF old growth survey protocol will be excluded from harvest.

Visual Quality (VQ)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to, Forest-wide Standards FW-183, FW-184, FW-185, FW-186, FW-187, FW-188, FW-189, FW-190, FW-191, FW-192, FW-193, FW-197, FW-200, FW-201, FW-235.

2. In areas with a High Scenery Integrity Objective (SIO) visible from Concern Level 1 travelways, which include Brush Creek Road (SR 602), Virginia Highlands Horse Trail (FST 337) and Ewing Mountain Trail (FST 4614), retain sufficient vegetative screening along trail and road corridors such that treatments are not noticeable to the casual observer. Typically retained higher basal area or untreated buffer of 70 -100 feet of forest is sufficient.

3. In areas with Moderate SIO retain sufficient vegetative screening along trail and road corridors such that treatments that are visible and noticeable to the casual observer are subordinate to the surrounding landscape character; typically 50 - 80 feet is sufficient.

4. Where visible from concern level 1 and 2 travelways and use areas, temporary roads, skid roads, and landings will be revegetated following management treatments.

5. Skid roads will be obliterated (recontoured to natural-appearing terrain) within 50 feet of the centerline of system trails where they cross system trails..

6. Treatments in units (C4972 S36, Map 5), (C4973 S15, Map 6), (C4973 S25, Map 6), (C4974 S5, Map 7), and (C4977 S9, Map 9) should avoid straight lines, geometric shapes, and abrupt edges when vegetation is cut. The edges of the treatment units should be feathered, leaving irregular clumps and variable densities of retained vegetation.

7. Treatments in units (C4970 S5, Map 2), (C4971 S1, Map 4), and (C4973 S15, Map 6) should retain sufficient vegetative screening along the private property boundary such that treatments are not evident to the casual observer. Typically an untreated buffer of 70 - 100 feet of forest is sufficient.

Wildlife and Fisheries (WF)

1. All relevant Forest Plan direction will be followed. Specific guidance is found in, but not limited to Forest-wide Standards FW-12, FW-20, FW-21, FW-32, FW-33, FW-35, FW-46, FW-48, FW-49, FW-50, FW-51, FW-52, FW-58, FW-129, FW-132, MA Rx *8E1 - Ruffed Grouse/Woodcock Habitat Emphasis* Standards 8E1-004, 8E1-009, 8E1-017, MA Rx *9H - Management, Maintenance, and Restoration of Forest Communities* Standard 9H-003, and MA Rx *11- Riparian Corridors* Standards 11-001, 11-002, 11-045, 11-046, 11-047, 11-048, 11-049, 11-050, 11-051, 11-052, 11-053, 11-054,

2. To protect Indiana bat (*Myotis sodalis*) populations:

    a. Leave all shagbark hickory trees 6 inches diameter at breast height (dbh) and larger, except when they pose a safety hazard.

    b. Clearcut openings 10 to 25 acres in size will retain a minimum average of 6 snags or cavity trees per acre, 9 inches dbh or larger, scattered or clumped.

    c. All other harvest methods (and clearcut openings 26 to 40 acres in size) will retain a minimum residual basal area of 15 $ft.^2$ / acre (including 6 snags or cavity trees) scattered or clumped. Residual trees will be 6 inches dbh or larger, with priority given to the largest available trees that exhibit roost tree characteristics favored by Indiana bats.

    d. Timber sale administrators or biologists will conduct and report normal inspections of all timber sales to ensure that measures to protect the Indiana bat have been implemented, including provisions for protecting residual. Unnecessary damage to residual trees will be documented in sale inspection reports and proper contractual or legal remedies will be taken.

3. To facilitate the implementation of workable standards, the *Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan* (Conservation Plan) (Kirk and Huber, 2004) establishes a Conservation Zone, which will be applied within the Slate Spring Branch – Cripple Creek watershed (HUC 050500010803). The Conservation Zone will include the Riparian Corridor and the Channeled Ephemeral Zone.

4. The Conservation Plan standards are consistent with the Forest Plan. If the standards are modified, an interdisciplinary analysis will be needed, and will include the US Fish and Wildlife Service.

Appendix B

Stands proposed for commercial harvest

Compartment	Stand	Mngt Rx	Treatment	Acres	Site Index	Age (2021)	Forest Type
4970	2	7.E.2	Thin	7	88	81	56
4970	3	7.E.2	Thin	31	78	96	10
4970	5	7.E.2	Thin	30	90	91	56
4970	6	7.E.2	Thin	7	70	91	53
4970	7	7.E.2	Thin	12	100	91	42
4970	10	7.E.2	Thin	15	75	81	42
4970	11	7.E.2	Thin	11	80	96	10
4970	12	7.E.2	Thin	11	70	81	42
4970	22	7.E.2	Thin	25	85	76	3
4970	35	7.E.2	Thin	16	65	111	15
4970	39	7.E.2	Thin	24	80	91	10
4970	55	7.E.2	Thin	16	90	101	10
4970	66	7.E.2	Shelterwood w/ reserves	19	100	101	50
4970	71	7.E.2	Thin	20	54	91	10
4970	87	7.G	Type conversion	12	101	37	3
4971	1	8.E.1	Clear-cut	22	85	93	60
4971	2	8.E.1	Thin	11	66	76	60
4971	5	8.E.1	Clear-cut w/ reserves	31	63	105	60
4971	7	8.E.1	Clear-cut w/ reserves	11	60	105	53
4971	8	8.E.1	Clear-cut w/ reserves	23	80	81	42
4971	14	8.E.1	Clear-cut w/ reserves	23	80	90	59
4971	17	8.E.1	Thin	73	60	91	60

Compartment	Stand	Mngt Rx	Treatment	Acres	Site Index	Age (2021)	Forest Type
4972	1	7.E.2	Thin	45	60	93	42
4972	4	7.E.2	Thin	14	60	98	42
4972	36	7.E.2	Thin	34	67	93	10
4972	41	7.E.2	Thin	18	58	93	42
4973	7	7.E.2	Thin	57	71	90	42
4973	15	7.E.2	Thin	116	81	90	10
4973	25	7.E.2	Thin	38	84	90	10
4974	5	7.E.2	Thin	17	50	117	42
4974	22	7.E.2	Thin	9	65	95	42
4974	29	7.E.2	Thin	28	80	84	10
4976	13	7.E.2	Thin	25	81	95	10
4976	21	7.E.2	Thin	48	78	96	42
4977	1	7.E.2	Thin	36	90	107	10
4977	1	9.H	Thin	3	90	107	10
4977	9	7.E.2	Thin	61	111	107	45
4977	14	7.E.2	Thin	10	97	107	10
4977	14	9.H	Thin	12	97	107	10
4977	16	7.E.2	Thin	57	66	102	60
4977	21	9.H	Thin	0	60	102	42
4977	22	9.H	Coppice w/ reserves	24	60	111	60
4977	23	7.E.2	Thin	46	79	90	42
4977	29	7.E.2	Thin	27	70	105	8
4977	31	7.E.2	Thin	11	75	107	42
4978	2	8.E.1	Clear-cut w/ reserves	39	70	107	52
4978	10	8.E.1	Clear-cut w/ reserves	10	60	107	60
4978	13	8.E.1	Thin	84	65	107	60
4978	17	8.E.1	Thin	89	65	107	42

Compartment	Stand	Mngt Rx	Treatment	Acres	Site Index	Age (2021)	Forest Type
4978	19	8.E.1	Clear-cut w/ reserves	8	80	88	10
4979	4	8.E.1	Clear-cut w/ reserves	65	85	86	10
4979	8	8.E.1	Clear-cut w/ reserves	54	72	96	42
4979	22	8.E.1	Clear-cut w/ reserves	36	62	113	60
4983	1	7.E.2	Shelterwood w/ reserves	16	100	91	3
4983	2	7.E.2	Shelterwood w/ reserves	13	75	86	3
4983	5	7.B	Thin	43	76	86	52
4984	3	7.E.2	Thin	32	60	96	60
4984	11	7.E.2	Thin	68	60	86	60
4984	15	7.E.2	Thin	23	87	96	10
4984	16	7.E.2	Thin	11	100	86	54
4984	17	7.E.2	Thin	4	70	91	52